

1579
ST. FRANCIS NURSERIES.

ILLUSTRATED

Wholesale Price List

OF

NURSERY-GROWN

EUROPEAN LARCH,

EVERGREENS,

Fruit, Ornamental, Shade and Deciduous

TREE SEEDLINGS.

CULTIVATED AND FOR SALE BY

H. M. THOMPSON & SON,

ST. FRANCIS, MILWAUKEE CO., WISCONSIN.

For the Fall of 1877 and Spring of 1878.

TO OUR PATRONS AND THE TRADE.

In presenting our Catalogue for the Fall of 1877 and Spring of 1878, we will state that the demand for Evergreens in past years has been mostly for ornamental purposes, and the trade has been principally confined to cities, towns and villages. The general financial depression has to a large extent led to the stoppage or curtailing of productions by the manufacturers, and has entirely thrown the efficient labor of the country out of steady employment. The demand for ornamental stock in a great measure *ceased*, but the stock on hand in the various nurseries which had been planted for the purpose of supplying the wants of the cities and villages, continued to *grow*. The result of this state of affairs has left a large quantity of Evergreens on hand, of so large a size as to be unprofitable to ship, and which must now either be sold to land owners in the immediate vicinity of the nurseries, at prices low enough to induce their planting for screens and windbreaks, or, where the land is not too valuable, they may be allowed to grow on the land they now occupy, for forest and advertising purposes.

In view of the fact that there has been but very limited planting of small sizes of Evergreens for some time past, to meet the usual demand for this class of trees, which will be renewed as speedily as financial affairs are adjusted and labor finds remunerative employment—a result toward which the present good farm crops and fair prices will contribute—and in view of the impetus now being given to the planting of Evergreens and Larch, etc., for screens, windbreaks, plantations and timber-belts, it becomes an important question if the nurserymen throughout the country are preparing to meet the probable demand for Evergreens for ornamental and other purposes, of such sizes as are required by planters, and profitable to ship.

All our seedlings are handled with the least possible exposure, and the packing is done under the personal supervision of the proprietors, who have had many years' experience in growing Evergreens from seed, and in packing to ship safely over long routes, when no extraordinary detention occurs. And we would also call the attention of those nurserymen who design importing Evergreen Seedlings, to the fact that we have had costly experience in importing such stock, and would represent that American nursery-grown Evergreen Seedlings are more sure to live, making a better growth the first season, and in the end give better satisfaction to the nurserymen and to tree-planters.

Our small sizes (6 inches or less) of seedlings we only recommend to nurserymen, or to those parties who will bestow the same care and attention in handling, planting and shading, as is given by experienced gardeners. Our Seedlings, 6 inches and more in height, are safe to plant in nursery row, and will at the end of two or three years make nice trees, suitable for forest plantation or ornament. Many of our once transplanted Seedlings will make good ornamental trees, and many of them may be at once planted where they are to permanently remain.



EVERGREEN SHELTER-BELTS, AND ORNAMENTAL HEDGES.

TERMS:

ORDERS FOR SEEDLINGS AND SEEDS ARE SUBJECT TO THE FOLLOWING CONDITIONS:

Cash or Bank reference to accompany orders from unknown correspondents. Known established Nurserymen or Seedsman's orders, subject to sight draft 30 days from date of shipment, unless special agreements are otherwise made, 10 per cent. interest charged on all accounts over due.

C. O. D. orders must be accompanied with cash to half the amount of order.

5 per cent. discount from price list rates when cash to the full amount accompanies the order.

Unknown parties ordering seedlings to be sent by freight, may deposit the money to the full amount of the order, with the nearest United States, American, Adams, or Wells & Fargo express agent, the money to be forwarded on arrival of goods, taking the express agent's receipt therefor, and sending the receipt with the order.

Express charges on all money packages should be prepaid.

Remittances may be made by draft on New York, Philadelphia, St. Louis, Chicago, or P. O. order on Milwaukee, Wisconsin, and small amounts at our risk by registered letter to our P. O. address.

All seedlings promptly handled, and packed with great care, for which cost of labor and material will be charged.

No charge is made for delivering packages to any steamer's dock, R. R. depot or express office in the city of Milwaukee, or express at St. Francis, or express or R. R. depot at Oak Creek, or Bay View stations.

After delivery to P. O., R. R., steamer dock, or express, our responsibility ceases. When losses occur through detention or neglect en route, claims should at once be made on the forwarders.

When plants are ordered to be sent by mail, 50 per cent. should be added to price list rates, for postage and cost of packing.

Mistakes cheerfully corrected, if notified of the same within ten days after receipt of plants.

Parties ordering seedlings should specify the route by which they wish them sent, otherwise we shall ship by such route as we consider best. Letters of inquiry or orders should have the P. O. address (R. R. Station, County and State) plainly written.

Fifty seedlings of any one sort at 100 rates, 500 do. at 1000 rates.

Facilities for shipping by mail, express, railroad and steamer, not excelled by any point west of New York.

Nursery situated two miles south of Milwaukee city limits, and one-third of a mile south of St. Francis station, on the Milwaukee and Chicago division of the C. & N. W. R. R., which passes through the nursery grounds.

Parties wishing to examine our stock can take the cars on Milwaukee division of C. & N. W. R. R., at passenger depot, foot of Wisconsin St., or at the Elizabeth street platform on the South Side.

H. M. THOMPSON & SON,

St. Francis, Milwaukee Co., Wis.

Address Telegram Orders to "Thompson," St. Francis, Milwaukee Co., Wis., *via* Milwaukee.

The Necessity for Forest Planting.

The necessity for more accurate and extensive information in regard to the cultivation of trees, owing to the great destruction of native timber to supply the increase of population and the ever growing wants of men, have compelled mankind to devote considerable attention to the subject during the last half century, and many facts, interesting and profitable, especially to the farmer, have been established as cardinal truths in the field of investigation. It has been found that in those countries in which the cutting of timber has been left to the interest or caprice of the individual, the destruction of the forests have been followed by such climatic changes as in nearly all cases to make the country barren, and from this cause uninhabitable, and the Governments of a number of European States have, in view of this fact, established Bureaus of Forestry, and prohibit the cutting of the trees except under its direction and by its permission. The steppes of Central Asia, once the garden of the world, covered by great forests, and producing support for the vast hords of Aryans, the ancestors of all the Caucasian races has, since the destruction of its trees, become a pathless and almost lifeless waste, producing only the saksaval, a species of bramble. Although this country is in the same latitude as Ohio and Illinois, yet Capt. Burnaby, in his account of his ride to Khiva, in the winter of 1875-6, describes the cold of the Kinghis Desert a thing unknown in the Arctic region. The summers are very short, and the Russian expedition of '73 suffered intensely from the heated glare of the atmosphere, and both the men and animals nearly perished from the want of water, the thermometer often standing at upwards 130 degrees Fah. Egypt, once the world's granary, would now, was it not for the annnal overflow of the Nile, be uninhabitable; and that this is caused by the loss of its forests is amply proved by the fact that those portions in which the Khedive has begun the planting of trees, are being again visited by rain after the lapse of unknown centuries. The plantation of the Khedive already number over thirty millions of trees. Since the opening of the Suez Canal and the planting of trees on its borders, the adjacent country has improved in a wonderful manner in its fertility. Palestine, described in the Bible as a land "flowing with milk and honey," now produces less than the scattered population consumes. Large portions of Italy, Southern France, and especially Spain, which abounded with forests in former days, have since their loss become untenable for ordinary agricultural purposes.

It is a proved fact that timber protection is absolutely necessary for the successful growing of certain crops and fruits. In the time of Napoleon the First, the woods at Piazzatore having been desolated, maize, the principal crop, could, from the severe change in the climate, no longer be produced, but upon the replanting of the trees, its production was once more easy. Lands adjoining the western shore of Lake Michigan, at an early period in the history of the settlement of the country, produced an annual yield of from 25 to 35 bushels of wheat per acre. At this time, when only about one-tenth

of the original forests remain, winter wheat is a failure, being winter-killed, and its cultivation has been abandoned. Spring wheat, that could in early days be relied upon to give an annual yield of 22 to 25 bushels per acre, cannot be estimated now at more than from



MOUNTAIN ASH.

10 to 15. The same state of facts will be found to exist in the Genesee Valley in New York, in Southern Michigan, and in fact all wheat producing districts formerly covered with timber,

from which any statistics can be gathered. And though this may in some part be ascribed to the exhausting of the necessary chemical constituents for the production of wheat by constant cropping, yet the results which are found to follow when the forests are again replanted, are such as to force the conclusion that it is in great part, if not wholly, due to their destruction.

The peach, which was grown in all parts of Southern Michigan, is now confined to a narrow belt along the eastern shore of Lake Michigan, where it is protected by the never freezing waters of the lake. Portions of France, Italy, Belgium and Holland, which were rendered barren by the cutting of the woods, have again been reclaimed to agriculture by the restoring of the trees. Wherever a country has been denuded of its timber, it is found that the summers are hotter and much more dry, that the winters are colder and more severe, that the changes from hot to cold and from cold to hot are much more sudden, that frosts are more frequent, and that in every way the climate is rendered excessive. It is from this reason that crops and fruits that were once easy to raise, under the protection of the woods, are found to be failures after their destruction.

One of the first and soonest noticed results of the loss of timber is the failing of springs and the shrinkage of streams. There is hardly a locality in which any considerable portion of the trees have been cut but what the decreased flow of water in the brooks and rivers is fully apparent, and many of the large streams upon which large mills at great expense have been erected, and upon which the farmers have depended largely for their water, have become in many months of the year totally dry. Such streams are also apt in the rainy months to become torrents, and often work dire distress to those to whom in former days they had proved but constant benefactors. Springs, also, that for years have been never-failing, gradually cease to flow, often causing great expense to farmers in the construction of wells and cisterns. Countries deprived of the production of their forests are visited by frequent and severe hail-storms, doing often times immense damage to growing crops and fruits. Trees also exercise a great influence in the general humidity of the air, protecting by their shade the quick evaporation of moisture from the earth by the sun, and also shield the soil from the effects of the winds, thus rendering the benefits of rains of a much longer duration, and mitigating the severity of droughts. In fact, the benefits of trees in acting as wind-breaks cannot be overestimated. Dussan maintains that the "Mistral," the dreaded northwest wind of France, is the result of the devastation of the forests, and that it can only be guarded by the replanting of timber belts. The southwest winds that are frequent in Wisconsin and Iowa, are a great cause of injury to the farmer, and can be neutralized only in a like way.

Many portions of Wisconsin consist of a light, sandy soil, and when this is denuded of its forests, and the spare undergrowth of grass and small shrubs is exposed to the united influences of the sun and winds, it may be expected that the adjacent fertile lands will be covered by driftings of light sand, such as will in time render them

not fit for cultivation. In many places in England and Scotland, where the timber has been cut, the sands have encroached on the cultivated fields at the rate of over five miles in a century, and the sites of towns once teeming with busy life, are now but heaps of ever moving sands. That the country in which is situated the Pyramids and the Sphynx was once fertile is known, and Babylon and Palmyra



WHITE SPRUCE. (*ABIES AMERICANA ALBA.*)

are but further examples of what sand may do when released from the useful bondage of the woods. The influence of the trees on the snow is also to be considered. In such places as are not protected by forests of tree-belts, the snow is blown into drifts, leaving the crops unprotected in many places, and the loss of the snow's protection

during our severe winters is without doubt the principal reason why we are no longer able to raise winter wheat. It is only since the felling of the forests in Asia Minor and Cyrene that the locust has become so fearfully destructive in those countries, and the grasshopper that threaten to become so great a pest to the agriculture of many of our States, breeds in injurious number only where a wide extent of country is bare of woods, such as the dry, treeless plains of Colorado and Western Kansas, which admit of the full heat of the sun to hasten the hatching of the eggs, which gather no moisture to destroy them, and which harbor no birds to feed upon the larvæ. The advantage of trees or plantations of timber in furnishing habitation for birds has been estimated much too low, and at this date, when we are year by year introduced to new insects that prey upon our crops, we cannot do too much to serve the birds, our constant friends. It is also a fact that the chinch bug is not able to traverse a tree-belt of the usual width of planting, the cold, damp soil presenting to them an impassible barrier. If this be true that the destruction of the forests makes the temperature more uneven, the summers more hot and dry, the winters more severe; that it exposes our crops to the distressful action of the southwest and the northwest winds; decreases the amount of rainfall; and dries up our springs and seriously diminishes the flow of our brooks and rivers, going as dry watercourses to-day and raging torrents to-morrow; if it renders our fertile acres liable to be covered by the constantly drifting sands; deprives our fields of the most useful protection of the snow, leaving them open to the rapidly increasing number of crop-destroying insects; that many crops easily raised under the shadow of the woods are no longer profitable, it is quite time that every prudent agriculturist should turn his attention to the subject of tree culture, that he may realize not only the immediate profitable returns in the way of increase of production, but also defend his fields from the more remote results that have rendered countries quite as fertile as ours, barren wastes, untillable and uninhabited.

It is estimated that to meet so largely increased needs of the people in the way of timber, that not less than twenty per cent. of our lands must be kept in forests, and as we are each day learning to live more rapidly, this amount will soon be found too small. Lands in Scotland and England, and in nearly all parts of Continental Europe, are now being or have already been planted with the Larch, Pine, and other hardy trees, and in such broken and hilly countries such plantations may prove sufficient. But in our level and flat Western States, the importance of tree-belts cannot be too strongly urged upon the attention of our farmers. Of really waste and non-producing land we have fortunately very little, and our farmers will but slowly give up their annually producing acres in large masses to the much slower, though quite as profitable, crops of timber. But the necessity of shade-tree planting is so pressing that tree-belts around and across the farms are rapidly being pushed, and the testimony of such farmers as have an-

ticipated the need is of such a highly encouraging nature that information as to the methods and the kind of trees best adapted for such planting is eagerly sought for.

It has been found that belts of from seven to eight rods in width are, all things taken together, the best. These belts should be planted on the outside with some evergreen, whose roots strike deep into the ground and do not spread near the surface, and whose leaves and branches will afford protection from the winter winds. In the centre can be placed the deciduous trees. If, however, the farmer wishes first to experiment and should think belts of this width entail too much cost and labor, belts of two or three rows will be found to make remunerative returns, and even one row planted, say not more than six feet apart, will give rich returns in increase of crops and add very much to the attractions of the estate. The trees for planting should be those best adapted to the soil and situation, and will vary much with different localities. There are, however, certain trees such as the Larch, Scotch and Pitch Pine, that are so well adapted to dry soils, rich or poor, and the Norway Spruce, Scotch, Austrian, and White Pines, American Arbor Vitae and White Ash, which are the best for moist, rich soils, and which so fully meet the wants of the farmer that they should always form a large portion of his planting. Belts composed of Scotch Pine, Norway Spruce, White Ash and European Larch, planted from the outside of the belt in the order named, have been found to meet in almost every particular the need for which they are planted, and to afford the farmer every protection in the way of timber that he can want.

The value of such timber-belt is felt very early, and cuttings for stakes, hoop poles, bean poles, fuel, &c., begin much more early than may be thought; while the after-products of hop poles, telegraph poles, railroad ties, lumber for general use, follow year by year and are a constant annual source of profit. The advantages to the crops are felt almost immediately, and the return in this way very soon pays for all expenditures. "Judge E. C. Whiting, of Monroe Co., Iowa, who has had as much experience in forestry and especially in planting tree belts, as any other man in the State, assures us that the increase in his crops consequent upon the use of shelter-belts has paid, and will fully pay all expenses for the culture of the trees."* In conclusion, it may be said that while the planting of shelter belts of trees has become a wide-felt necessity, yet such plantation are not like fences and many other forced improvements, a constant source of expense to the farmer, but are themselves of the greatest advantage and profit, and the increased value of a farm which has a well-planted and well-situated woodland is such as will many times cover the value of all expense in planting.

* Trans. Ia. St. Hortl. Scty., 1876.

European Larch.

The European Larch belongs to a class of timber that exhibit in its tall, straight form, glossy velvet green foliage, and the desirability and utility of its wood, that combination of stately beauty, grace and usefulness, known to but few if any other kind of forest tree. As the qualities of the Larch become known, it is being adopted as one of the most desirable trees for forest-planting.

In Europe, the Larch has been demonstrated to be one of the most



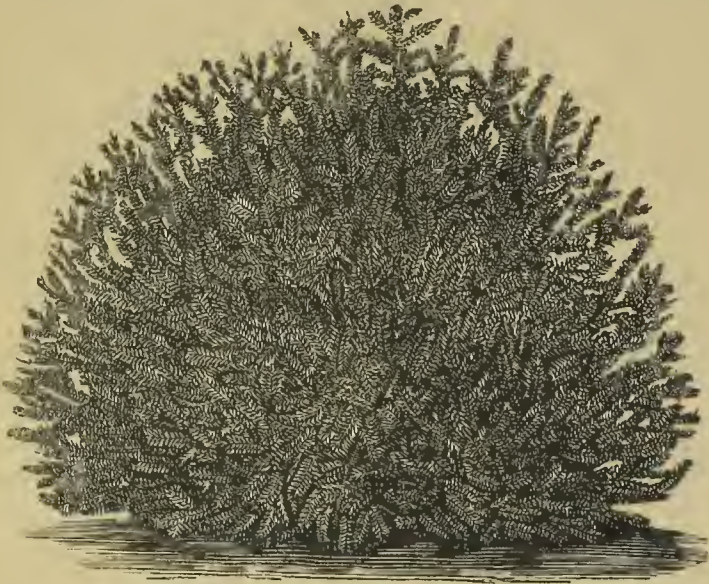
EUROPEAN LARCH.

profitable to plant of all forest trees, owing to the special purposes to which the wood is adapted, and the ease with which it can be propagated in large quantities, and the rapidity with which it can be grown, and the poor soils upon which it will flourish.

By reference to the table it will be seen that the wood of the Larch, as compared with the White Oak as to strength, is as 9 to 11, and as to toughness, is as 55 to 61; and the weight per cubic foot of Larch is 31 pounds, and that of White Oak is 42 pounds. It is

readily seen that a wood so light, and at the same time so strong and tough, combined with its durability, must make a most valuable kind of timber for the uses to which it is adapted. When dry, the tenacity of the wood to hold nails is so great it is nearly impossible to extract them, the nails usually breaking before the wood will yield.

The durability of the wood of the Larch for many purposes is much greater than that of any kind of Pine, Fir or Spruce. Instances of the preservation of the wood of the Larch have been recorded, in which it is stated that logs of wood imbedded in peat to the depth of twelve to fifteen feet have been found to be sound and were sawed into boards. It is stated that the foundations of many of the buildings in Venice are upon Larch piles, and that after the lapse of cen-



DWARF ARBORVITÆ.

turies the timber is found to be comparatively sound. Experiments to test the durability of the Larch, made at the request of the Duke Athol, show that Oak and Larch piles driven down by the side of a sea wall, and subjected to the alternations of wet and dry by the rise and fall of the tide; the Oak piles were twice replaced, and the wood of the Larch piles remained sound. According to Kasthoffer, as stated by Loudon, "the wood of the Larch lasts four times longer than that of Oak."

In speaking of the durability of wood, it may be well here to remember the general fact that the durability of all kinds of wood, when subjected to the alternations of wet and dry, depends on the proportions of heart-wood to sap-wood, and that young timber, mak-

ing a rapid growth, contains more sap-wood in proportion to heart-wood than old, large timber, and hence, in estimating the durability of different kinds of wood, or of the same kind of wood grown in different soils and localities, and under different conditions of cultivation, regard must be paid to the age of the timber. The durability of the Larch is subject in these respects to the same conditions as apply to the wood of other kinds of trees.

The sap of the Larch tree being resinous, the durability of the wood is increased by stripping off the bark, and seasoning before subjecting the wood to the conditions of wet and dry. This fact is worthy of special attention when the wood is intended for stakes, hop-poles, telegraph-poles, and fence-posts, the timber for these purposes being usually made from young trees, which contain a large proportion of sap wood, and is subject to earlier decay if the proper conditions of the preparation of the wood before using are not complied with.

The growth of the Larch is rapid in all-dry soils, but the rapidity of growth is dependent upon the quality of soil, system of planting, culture, climatic conditions and the system adopted in making the thinnings necessary to insure a healthful growth and profitable returns, whether the plantations be made in the form of groups or belts. The first year's growth of the Larch from seed planted in seed-beds varies from two to six inches. At the end of the second year the seedlings in the seed-bed usually attain the height of six to eighteen inches. At the age of two years the seedlings are usually removed from the seed-beds and transplanted into nursery-row, or into permanent plantations. The growth of the trees for one or two seasons after transplanting is mainly confined to the development and extension of the side branches and roots; after the second season's growth from the time of transplanting—the trees being now well established—the growth of the trees is very rapid, the upward extension of growth ranging from eighteen to thirty-six inches a year, for a period of thirty or forty years; after this time until the tree attains the age of seventy years, the growth is slower, and the accumulation of heart-wood is in larger proportion to the white or sap-wood, than during the first thirty to forty years of growth, at which period of time it is estimated the growth of the Larch has arrived at the maximum of *profit* for ordinary use, although the *growth* of the wood does not attain the maximum until the trees attain the age of seventy years. The life of the Larch, as stated by Loudon, "in the natural forest, is 150 to 200 years."

Reference as to the rate of growth of the Larch in Western soils is made to the following data, as stated by the planters of the trees:

D C. Schofield, of Elgin, Ill., "has a plantation of 50,000 trees composed of twenty-five kinds, including the European Larch, nineteen years planted. The height of the Larch tree is 35 to 40 feet; the diameter three feet from the ground is 8 to 14 inches. These trees were planted in dry, rich, prairie soil, underlaid with gravel at the depth of 6 to 8 feet, and have had the best cultivation."



NORWAY SPRUCE (*ABIES EXCELSA*).

A. R. Whitney, of Franklin Grove, Lee Co., Ill., planted Larch seventeen years ago, which have attained the height of 60 feet, and have a diameter of 18 inches.

Suel Foster, of Muscatine, Iowa, planted Larch trees nine years ago which now average 18 feet in height, and an average diameter of 5 inches three feet from the ground. Soil, clay. Mr. Foster says that in his plantation "the trees were too closely planted" to attain the most rapid growth.

Laurie Tatum, of Springdale, Iowa, reports the growth of his Larch, six years planted, average height 19 feet, average diameter three feet from the ground, $3\frac{1}{3}$ inches.

S. Edwards, of La Moile, Illinois, reports the growth of Larch 20 years planted, average height, 50 feet; average diameter three feet from the ground, 10 inches.

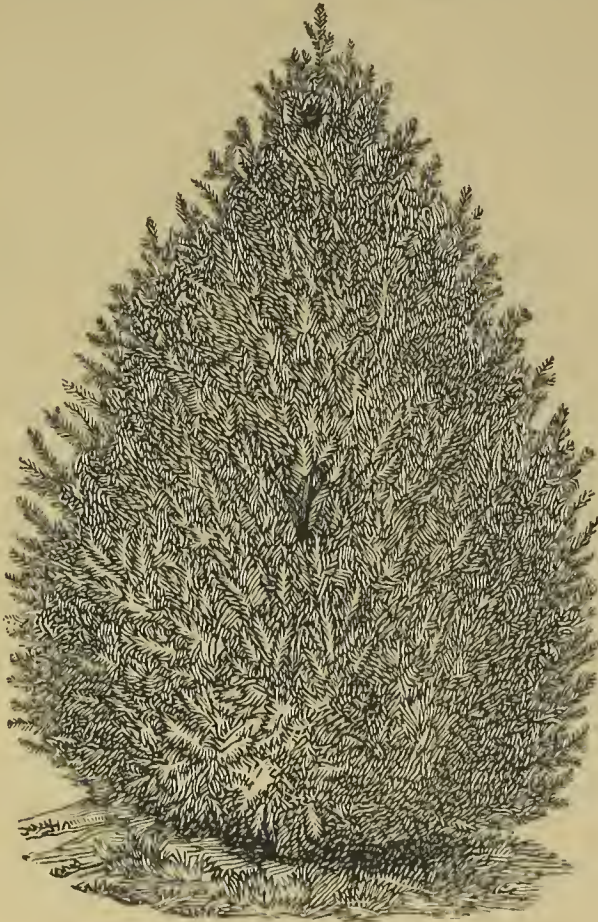
The statistics of the growth of European Larch in Europe and Massachusetts, where the plantings have been made in lands so broken, rugged and rocky, or in sterile, sandy soils, as to be entirely unfit for ordinary agricultural purposes, show the average annual growth to be $\frac{1}{2}$ inch in diameter, and an upward growth averaging from 18 to 24 inches per annum for a series of 20 to 40 years. According to Loudon the rate of growth in the climate of London is 20 to 25 feet in ten years. In medium to rich soil, in the Western States, the average annual rate of growth in diameter is from $\frac{1}{2}$ inch to 1 inch, and an upright growth of 21 to 36 inches per annum, for a series of 9 to 20 years.

The experiments of Forest Tree planting made by the Messrs. Fay of Massachusetts, showing the rapid growth of the Larch planted in sterile soil, as stated by Prof. Sargent in his Suggestions on Tree Planting, is worthy of attention. Prof. Sargent says:

"But few experiments in arboriculture except on the most limited scale, have been attempted in Massachusetts, but I will describe the two most important which are of special interest, as showing what our unimproved lands are capable of, if judiciously managed.

Mr. Richard S. Fay commenced, in 1846, planting on his estate near Lynn, in Essex County, and in that and the two succeeding years planted two hundred thousand imported trees, to which were afterwards added nearly as many more directly from seed, nearly two hundred acres being covered in all. The sites of these plantations were stony hillsides, fully exposed to the wind, destitute of loam, their only covering a few struggling berberry bushes and jumpers, with an abundant undergrowth of wood-wax (*Genista tinctoria* L.), always a certain indication in Essex County of sterile soil. He employed in his plantations, Oaks, Ashes, Maples, Norway Spruce, Scotch and Austrian Pines; but the principal tree planted was European Larch. No labor was expended on the land previous to planting the trees, about one foot high, being simply inserted with a spade, and no protection has at any time been given them, save against fire, and browsing animals. I recently visited these plantations, twenty-nine years after their formation, and took occasion to measure several of the trees, but more especially the Larches. Some of these are now over fifty feet in height, and fifteen inches in diameter three feet from the ground, and the average of many of the trees examined is over forty feet in height and twelve inches in diameter. The broad-leaved trees have also made a most satisfactory growth, and many of them, on the margins of the plantation, are fully forty feet high. During the past ten years about seven hundred cords of fire-wood have been cut from the plantations, besides all the fencing for a large estate. Fire-

wood, fence-posts and railroad sleepers, to the value of thousands of dollars, could be cut to-day, to the great advantage of the remaining trees. The profit of such an operation is apparent, especially when we consider that the land used for these plantations did not cost more than ten dollars an acre, and probably not half that amount."



SIBERIAN ARBORVITÆ.

"The second experiment was made by Mr. J. S. Fay, a brother of Mr. Fay of Essex County, on his estate at Wood's Holl, in Barnstable County, on the extreme southwestern point of Cape Cod. A tract of land one hundred and twenty-five acres in extent, which is now densely covered with Mr. Fay's plantations, was in 1853, seemingly as little fitted for the purpose of tree culture as can well be imagined. It was fully exposed to the cold northwest winds of winter sweeping across Buzzard's Bay, and to no less baneful southwest winds of summer, which came from the Atlantic loaded with saline moisture."

In answer to an inquiry as to the nature of the soil on which his plantations are made, Mr. Fay writes me: "My land is made up mainly of abrupt hills and deep hollows, sprinkled over with bowlders of granite. The soil is dry and worn out, and what there is of it is a gravelly loam. The larger part consisted of old pastures, and on the one hundred and twenty-five acres, not a tree of any kind, unless an oak that sprang out of the huckleberry bushes here and there, barely lifting its head above them for the wind, and when attempting to grow, browsed down by the cattle ranging in the winter, could be called a tree."

Thirty-five thousand trees were imported and set out, besides a large number of native trees procured in this country; but fully three fourths of the whole plantation was made by sowing the seed directly on the ground where the trees were to stand. A large variety of trees, both native and foreign, and while few have failed entirely, the foreign species, as was to be expected from the situation, have been the most successful. The Scotch Pine has made the most rapid growth, and then European Larch." * * * *

The statement of Emerson in his "Forest Trees of Massachusetts," as to the experiments of the Dukes of Athol, in planting European Larch, is so curious and interesting that we note it in his own words, and at some length.

"The estates of the Dukes of Athol are in the north of Scotland, and in the latitude of nearly 57 degrees north. Between 1740 and 1750, James, Duke of Athol, planted more than twelve hundred Larch trees, in various situations, for the purpose of trying a species of tree then new in Scotland. In 1759 he planted seven hundred Larches over a space of twenty-nine Scotch acres, intermixed with other kinds of forest trees, with the view of trying the value of the Larch as a forest tree. This plantation extended up the face of a hill from two hundred to four hundred feet above the level of the sea. The rocky ground of which it was composed was covered with loose and crumbling masses of mica slate, and was not worth over £3 a year all together. Before he died, in 1764, he was satisfied of the superiority of the Larches as timber, over the other Firs, even in trees of only eighteen or nineteen years old. His successor, John, Duke of Athol, first conceived the idea of planting the Larch by itself as a forest tree, and of planting the sides of the hills about Dunkeld. He planted three acres with Larch alone, at an elevation of five or six hundred feet above the level of the sea, on soil not worth a shilling an acre. He also planted four hundred acres on the sides of the hills before his death, in 1774. His son John, continuing the extension of his father's plans, had planted in 1783, two hundred and seventy-nine thousand trees.

Observing the rapid growth and hardy nature of the Larch, he determined to cover with it the steep acclivities of mountains of greater altitude than any that had yet been tried. He therefore enclosed a space of twenty-nine acres, 'on the rugged summit of Craig-ybarns, and planted a strip entirely with Larches, among the crevices and hollows of the rocks, where the least soil could be found. At this elevation none of the larger kinds of plants grew, so that the grounds required no previous preparation of clearing.' This plantation was formed in 1785 and 1786. Between that year and 1791, he planted six hundred and eighty acres with five hundred thousand Larches, the greater part only sprinkled over the surface, on account of the difficulty of procuring a sufficient number of plants. Besides a plantation of seventy acres for the purpose of embellishment, he had, in 1799, extended his plantations of Larches over an additional space of eight hundred acres, six hundred of which were planted entirely, though thinly, with Larch. These took eight hundred thousand plants.

"Observing with satisfaction and admiration the luxuriant growth of the Larch in all situations, and its hardihood even in the most exposed regions, the Duke resolved on pushing entire Larch plantations still further to the summit of the highest hills.

He therefore determined to cover with Larch, sixteen hundred Scotch acres, 'situated from nine to twelve hundred feet above the level of the sea. Its soil, presenting the most barren aspect, was strewn over thickly with fragments of rock,

and vegetation of any kind scarcely existed upon it.' 'To endeavor to grow ship timber,' writes the Duke, 'among rocks and fragments of schist such as I have described, would have appeared to a stranger extreme folly, and money thrown away; but in the year 1800 I had for more than twenty-five years so watched and admired the hardihood and the strong vegetative powers of the Larch, in many situations as barren and rugged as any part of this range, though not so elevated, as quite satisfied me that I ought, having so fair an opportunity, to seize it.'

These, with four hundred acres more, occupied from 1800 to 1815. 'Having now no doubt whatever of the successful growth of the Larch in very elevated situations, the Duke still further pursued his object of covering *all* his mountainous regions with that valuable wood. Accordingly, a space to the northward of the one last



WEeping MOUNTAIN ASH.

described, containing two thousand nine hundred and fifty-nine Scotch acres, was immediately inclosed and planted entirely with Larch. This tract, lying generally above the region of broom, furze, juniper, and long heath, required no artificial clearing. An improved mode of planting was employed here, and that of using young plants only, two or three years' seedlings put in the ground by means of an instrument invented by the Duke, instead of the common spade.' In 1824, the growth of the Larch in this last tract, called 'Loch Ordie Forest,' having greatly exceeded the sanguine hopes and expectations of the Duke, he determined on adding to it an extensive adjoining tract, consisting of two thousand two hundred and thirty-one

Scotch acres, denominated Loch Horshnie. The preparations of fencing, clearing (where that was necessary), making roads and procuring plants from different nurserymen occupied the time till October, when the planting was commenced and carried on in such good earnest that the whole was finished by December, 1826.

The planting of this forest appears to have terminated the labors of the Duke in planting. He and his predecessors had planted more than fourteen millions Larch plants, occupying more than ten thousand English acres. It has been estimated that the whole forest on mountain ground, planted entirely with Larch, about six thousand five hundred Scotch acres will, in seventy-two years from the time of planting, be a forest of timber fit for building the largest ships. Before being cut for this purpose, it will have been thinned to about four hundred trees to the acre. Supposing each tree to yield fifty cubic feet of timber, its value, at one shilling a foot (one half its present value) will give £1,000 an acre, or in all the sum of £6,500,000 sterling. Besides this there will have been the value of the thinnings, and the increased value of the whole ground for pasturage."

Before referring to the most important uses of the wood of the Larch, it may be of value to observe, that in view of the enormous consumption of Hemlock bark, by the leather manufacturers in this country, and the wanton destruction of young trees by the farmers who are clearing lands for agricultural purposes, and who consider the wood of the Hemlock of no present or prospective value, may result in causing a demand for other vegetable substances to be used as a substitute for tanning purposes. One of the vegetable productions which may be required as a substitute for Hemlock bark, is the bark and twigs of the Larch, which, according to Loudon, contain tannin, and is used in Europe in the process of manufacturing leather.

The same authority also says, "Venice turpentine is produced from the sap, and Manna de Brancon is a product of the young twigs and flowers of the Larch," and that although "the wood for fuel ignites with difficulty, but when dry, if properly managed, the wood of old trees produces intense heat, and that the charcoal weighs 16½ pounds per cubic foot."

The principal uses of the wood of the Larch, as stated by various authorities, is for grape stakes, bean poles, hop and telegraph poles, ship knees, beams and top timbers, all kinds of dimension timber, fence posts and railway ties.

On account of the tenacity of the fibres of the wood of the Larch, and its power of resistance to the weight of passing trains, and its durability, the wood of the European Larch is preferred in Europe to all other wood when it can be procured, and such has been the extraordinary demand for Larch ties, for use in the construction and repairs of railways in Europe and India, that the supply of Larch has not been equal to the demand, and Scotch Pine has been substituted to supply the deficiency.

The wood of the White Oak, when it can be procured, is used for ties in this country in preference to any other kind of native timber. It is a question as to the length of time the native forest will continue to yield a supply of White Oak. When the facts of the yearly devastation of the forests by means of fire, the destructive agency of the uncaring for future generations, the Anglo-Saxon race, and the consumption by the various industries, in their constant demands, keep-

ing pace with the increase of population, upon the natural forest supply, are significant facts, which when collated and published will no doubt fully justify the supposition that, considering the losses, the demand, the supply and the distribution of the forests, and the availability for general use, that the available supply of White Oak must become exhausted at no distant period, and that as the White Oak is



MOUNTAIN PINE (PINUS MONTANA).

a tree of slow growth, and can not be now planted and grown in time to replace the exhaustion of the available natural forest supply, it is evident that in this country as in Europe, resort must be had to the wood of the European Larch. There can be no question, therefore, that if Larch plantations be made *now*, that there will be a profitable demand for their products long before the timber will have grown to be of sufficient size for railway ties and other uses.

The consumption of wood for railway ties alone is by no means inconsiderable. The total number of miles of railways in the United States, exclusive of switches and side tracks, as stated in Pool's Table, in the Wisconsin Railroad Commissioner's Report, 1875, are 72,623 miles, and taking the estimate of Mr. D. J. Whittemore, Chief Engineer of the Chicago, Milwaukee & St. Paul Railway, that the number of ties, facing six to eight inches, required per mile is 3,000, and the average durability of ties to be seven years, it would require an aggregate of 217,869,000 ties once in seven years to supply the railways in operation at the date of the Railroad Commissioner's Report, or an average annual consumption of 31,124,142.

In estimating the area of land necessary to be planted to Larch trees, to meet the requirements of railways in operation in 1875, for ties, it is assumed that 3,000 plants per acre are needed to make the planting, and that a series of systematic thinnings of the trees is adopted, for stakes, hop poles, fence posts telegraph poles and fuel, reduces the number of trees to 800 per acre, and the expiration of 35 years from the date of planting, and that 400 of these trees can be cut for ties without detriment to the remaining trees—which may be left to grow for piles, dimension timbers and ship building—and estimating the trees which are to cut for ties, to average two ties per tree, it would require a series of seven years' planting of $272,336\frac{1}{4}$ acres, or without allowances for casualties, an aggregate planting of 1,906,353 acres in a period of 35 years.

The number of posts required to fence the railways and the improved farms, supposing the latter are subdivided into farms of forty acres—offsetting the posts used for fencing city and village lots against the hedge and stone fences, and improved lands not fenced—and the poles for telegraph lines and hop yards in the United States, based upon the census returns of 1870, and the estimates of Chas. H. Has kins, General Superintendent Northwestern Telegraph Company, and hop dealers, may be seen at a glance, by referring to the following table:

Railways, No. of Ties.....	217,869,000	at \$0.50	Value, \$108,934,500 00
“ “ Posts.....	87,728,540	at 20 “	17,545,708 00
Farms, “ “	30,227,371,360	at 20 “	6,045,474,272 00
Telegraph Lines, No. of Poles,..	2,725,000	at 1.50 “	5,087,500 00
Hop Yards, “ “ ..	6,400,000	at 25 “	1,600,000 00

If the life of the ties is seven years, and the posts and the poles 16 years, the yearly consumption of wood for the uses specified in the table amounts to \$379,556,717.50. The foregoing estimate does not include the total consumption of wood for other purposes to which the wood of the Larch is suited, but enough facts are shown upon which to base estimates to show that plantations of the Larch, if made now, will prove much more remunerative for a series of years than ordinary farm crops.

If the thinnings of a Larch plantation be commenced at seven to ten years from the date of planting, and are continued in a systematic manner for thirty-five years, and the number of trees are reduced to 800 per acre, there can be no question but what the yield of wood

for use as stakes, hop poles, fence posts, telegraph posts and fuel, will reimburse the cost of plants, planting, culture, care, taxes and interest upon the investment, the remaining trees would represent the *remote* net profit, allowing for casualties.

The more *immediate* profit of such an investment would be represented in the advantage of having timber at hand on which drafts



AMERICAN WHITE ELM.

could be made to meet the emergency of the unforeseen wants of the farmer and the community, the enhanced value of the *whole* estate in consequence of a *portion* of the estate being forest, the enhanced value of the estate owing to its more *attractive* appearance,

aside from the *intrinsic* value of the plantation or timber-belt. The *increased* fertility of the soil consequent upon the action of the roots of the trees, in permeating and disintegrating the soil, and thereby increasing the available chemical constituents necessary for plant growth; the *accretion* of vegetable mould upon the surface of the soil, caused by the droppings and decay of the foliage from the trees, and the influence that groups, plantations and belts of trees exert in arresting the force of the wind, modifying the temperature, lessening the evaporation of moisture and radiation, and absorption of heat and the action of the foliage of the trees in cooling the atmosphere and condensing its moisture, and such other meteorological conditions as tend to ameliorate climatic extremes and prove *beneficial* to growing crops. In view of the rapidity of the growth of the Larch, and the benefits and profits which may be reaped in the course of one generation from the time of planting, from plantations composed wholly or partially of this tree, it may be said that there are few other kinds of trees that compare in value to the European Larch, more particularly in regard to the uses for which the wood is adapted.

In conclusion, the following suggestions relating to the handling and planting of the Larch, may be of value to the inexperienced planter:

In making a plantation or belt of European Larch, it should be borne in mind that the *quality* of soil is immaterial, so long as it is *dry*. It may be found profitable to use an admixture of Scotch Pine and such other valuable trees as will flourish in soils suited to the Larch. If the planting be in the form of belts for the purpose of shelter and timber, the principal portion of the Scotch Pine may be advantageously planted upon the margin.

As the European Larch commences growth at a *low* temperature, and as there is greater liability of loss of plants when planted after the commencement of growth, it is advisable to plant in the Fall of the year, or procure the plants in Autumn for the purpose of having them on hand for planting as *early* in the Spring as the ground is in proper condition for working. When the Larch is planted in the Fall, the ground should be mulched with straw, wild hay, or some other coarse material, or the earth ridged up to the plants with a shovel-plow to prevent injury to the roots, or the plants from being drawn out of the soil, by the alternation of freezing and thawing.

The sap of the Larch being of a similar nature to the sap of other coniferous (Evergreen) trees, but more volatile, and therefore more liable to evaporation, it is strictly necessary in handling to observe the same conditions of non-exposure of the roots to the rays of the sun, or to drying winds, and in planting to firmly press the soil on the roots and to disturb the soil immediately in contact with the roots as little as possible during the first season of cultivation after planting. When these precautions are observed, the Larch can be transplanted, subject to as little loss, as results in the planting of other valuable kinds of deciduous trees.

VALUABLE STATISTICS:

The following Table of the strength and value, etc., of some kinds of timber which are the most valuable for tree-belts and forest-planting, is made up and deduced from Haslett, Trautwine, Bull, Haswell, Barlow, and a number of other authorities. The omission of figures in full of some kinds of wood is to be attributed to their omission by the authorities which have been consulted. It is hoped, however, that this table may be of use to tree-planters as a basis for forming estimates of the comparative value of different kinds of wood, and that in some future issue of our Catalogue, the table may be completed.

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White Ash.

(FRAXINUS AMERICANA.)

The American White Ash, when planted in cool, deep, rich, and moist soils, is a tree of rapid growth. If planted singly so as to have room for the development of its branches, the head assumes a spreading and rounded form, and closeness in the growth and disposition of its branches, and mellow green color and density of foliage, so different from its usual slender stem, and open branches as seen in the natural forest, that it frequently causes surprise and admiration on the part of those observers of the works of nature, who delight in viewing the varying forms of growth, and the contrast in the size, shape, and color of the foliage, that occurs in the same or different species of plants and trees. For ornamental purposes, and for shade and roadside planting, the White Ash is indispensable. Its rate of growth in rich Western soils, is 18 to 24 inches per year.

The weight of the wood per cubic foot is 43 to 52 lbs., its specific gravity is 600 to 845 lbs.; its strength per cubic inch is 2.3 follows : Tensile, 14,000 lbs.; transverse, 198 lbs.; crushing, 6,663 lbs.; increase of strength by seasoning, 44.7 per cent.; proportion of charcoal to 100 parts of wood, 25.74; value of wood for fuel as compared with Hickory at 100, is 81.

In the ordinary out-door process of seasoning the wood dries fit for use in one-fourth of the time required for Oak.

The toughness, strength and elasticity of the wood of the Ash renders it the most valuable of all of our native woods for some of the most important uses required by man. There is scarcely an agricultural implement of any kind from a hoe-handle to a threshing-machine, which does not contain in whole or in part the wood of the Ash. The wood is used for hoops, spade, hoe, rake and pitchfork handles, bodies, brackets, sills, pillars, shafts and springs of wagons and carriages, oars, ship-blocks, hand-spikes, pump boxes, sofa and chair frames, bowls, cask staves, flour purifiers, fanning and smut mill frames, kitchen tables, steps of stairs, floors, and is coming into considerable demand for the interior finishing of omnibusses, cars, fine residences and churches.

The invention and introduction of improvements in machinery, tools and appliances for the purpose of cheapening and expediting the processes of the cultivation of crops and preparing for market, has resulted in an enormous demand for Ash lumber, and which, in combination with the demand for export to foreign countries, in the form of the raw or manufactured material, has resulted in a large diminution of the forest supply and an advance of prices within a few years in the Eastern States to the present price of \$70 to \$85 per thousand, and in consequence some of "the manufacturers who use Ash largely in the construction of implements have moved their establishments to Ohio and other interior States."

The forest supply of Ash in that portion of Wisconsin bordering upon Lake Michigan is practically exhausted. In the northern por-

tion of the lower Michigan peninsula, the supply is diminishing to such an extent that there is already a keen competition on the part of the Western manufacturers of agricultural implements, resulting in an advance in price of from \$12 per thousand a few years since to \$34 per thousand feet in the Milwaukee and Chicago markets, with the prospect of a speedy advance to near or quite the present value in Eastern markets.

The leaves of the Ash make their appearance later in Spring than many other valuable kinds of deciduous trees, and therefore prolongs the planting season, and as the plants when handled and transplanted with ordinary care are subject to little or no danger of loss, and as the wood can be used of smaller size for many purposes, and as the plants may be set much closer than many other kinds of trees, renders the Ash valuable and indispensable for such plantations and belts as are planted in soils suited to its growth.

According to Sargent's estimate, if the trees are planted in "rows three feet wide and two feet apart in the row, it will require 7,260 plants to the acre, and the first thinnings at the end of ten years will yield 4,000 hoop poles, which at present prices will yield \$400 per acre. The subsequent thinnings made at different periods for twenty-five or thirty years—reducing the number of trees to 108 per acre—would be worth at least three times as much more, a sum amply sufficient to reimburse all expenditures in making and caring for the plantation, taxes and interest upon the investment."

The absolute certainty of a demand for Ash wood, at a much larger average annual profit than results from any farm product, should induce the planting of the Ash upon hundreds of thousands of the many millions of acres of deep, moist and rich lands in the States of the Valley of the Mississippi River and its tributaries; containing all the elements necessary for the best growth and quality of wood. These States, by virtue of their location in the geographical center of the nation and of the North American continent, are—if land owners will grasp the opportunity—not only able to grow sufficient Ash to supply the *continental* demand at a *profit* to the *individual* producer, but also to *centralize* the location of the manufacturing establishments that use the wood of the Ash largely in the construction of implements and machines.

Black Walnut and Hickory.

In planting tree-belts of considerable width, or plantations of considerable extent, a suitable admixture of these valuable kinds of trees, in soils suited to the growth of the White Ash, will materially reduce the cost of the plantation, and should not be omitted. The nuts are usually at hand in the forest in most localities, or may be purchased at a small cost, and are easily germinated by planting as soon as gathered in the fall, or packed in moist earth or sand for spring planting. The seed may be sown at intervals, at the time of setting the White Ash plants, in furrows 4 or 5 inches deep.

Use and Value of Evergreens for Ornament, and Timber.

The Norway Spruce is not only effective in ornamenting grounds, but is also "useful for screens, hedges, and for timber." For all these purposes, and for general adaptation to different soils and climates, it may be said to be universally recognized as superior to any other evergreen tree that has been as generally distributed.

In Europe, the Scotch Pine is considered valuable on account of the rapidity of its growth and its adaptation to different soils, and "the facility with which the wood is worked occasions its employment in house carpentry to the exclusion of every other timber, when it can be procured." Loudon says: "As a timber tree, for planting in poor, dry soils, and in exposed situations, none can excel the Scotch Pine, and it is only equaled by the Larch." For screens and wind-breaks it is particularly valuable, when "not too closely planted, so as to allow the limbs to grow close to the ground." Belts of Scotch Pine will be more efficacious in breaking the force of strong winds, when Norway Spruce or Larch are intermixed in the plantation, on account of their pyramidal tendency of growth, which fills the gaps occasioned by the upward and more open growth of the Scotch Pine. For ornamental purposes the Scotch Pine should be sparingly used, except when allowed plenty of room, or in the centre of groups, or for the purpose of contrast in colors and form of growth. When the Scotch Pine is planted for any or all of these purposes in any dry soil, from the poorest to the richest, its rapid growth will produce satisfactory results, in a less number of years, than any other Evergreen; hence the Scotch Pine deserves a place in every collection, and forest tree plantation.

The Austrian Pine may be considered as valuable for ornamental purposes on account of the dark green color of the foliage, and its stiff outline of symmetrical rounded form of growth, peculiarly adapting it to plats of ground that permit of its having ample space. "In Austria the wood of this Pine is much valued when kept dry; and it is said to surpass even the Larch in resisting the injurious effects of water, or of alternate moisture and dryness."

The Mountain Pine (*P. Montana*) is similar in general appearance to the Austrian Pine, but dwarfish and more compact in its habit of growth, hence adapted for planting in smaller spaces near walks and drives, and can be planted with effect on the margin of ornamental groups with the faster growing Evergreens occupying the centre or back ground, and is useful as a covering for naked hill sides, and embankments.

The American Arborvitæ is deservedly a favorite evergreen for ornamental hedges, which are designed to be confined to a limited space in width, or height. Its vitality is but little impaired when subjected to annual, or semi-annual shearing, and may be pruned into any desired form. It may also be advantageously planted singly, or grouped with other Evergreens, and is valuable in timber plantations where any portion of the ground is too wet for European Larch, or other Evergreens. The durability of the wood for posts and stakes is not exceeded by any other Evergreen, except the Red Cedar.

Handling, Planting and Care of One, Two and Three year old Seedlings.

Evergreens and Larch should be unpacked as soon as received, and have their roots puddled in a thin mud mortar made of loam or other rich soil, and be placed in a cool shady situation, (roots damp, tops dry,) and keeping from exposure to the sun and drying winds before and while planting. In planting, the earth should be firmly packed about the roots. Seedlings less than six inches in height may be planted in beds four feet wide, the rows six or eight inches in width, and two or three inches apart in the row, and protected by a screen the first season. The second season the slow growing sorts may be exposed to the sun, provided the plants are mulched with straw, wild hay or saw dust. European Larch, Scotch and Austrian Pines at the end of one year may be transplanted into nursery rows or forest plantation. The climate of the U. S., and more especially in nearly all that section of country lying between a line running southeast from head of Lake Michigan and the summit of the Rocky Mountains, is so liable to drouth, that Nurserymen and Tree Planters will find it profitable to mulch all transplanted trees, or seedlings, the first season. The slow growing sorts of evergreens may remain in the beds two years before planting in nursery row.

All nursery grown Evergreen and Larch seedlings six inches or more in height may be planted in nursery rows two feet in width and six to ten inches apart in the row. Mulch the first season and in autumn draw earth to the plants with the hoe, or with a small sized shovel plow, in order to prevent the plants being thrown out of the ground by alternate freezing and thawing. At the end of two years the plants may be thinned by taking up every alternate row, and every other plant in the remaining rows, and replanting into rows four feet wide, or into permanent plantations. Seedling Evergreens treated in this manner will be stocky, and well furnished with side branches and fibrous roots, essential requisites for trees designed for ornamental planting.

All the nut bearing and other fast growing deciduous tree seedlings should be transplanted at one year old.

Fall Planting and Winter Protection of Evergreen Seedlings.

In our practice we have been very successful in transplanting and heeling-in Evergreen Seedlings, in the months of August and September, by mulching or shading the plants in the dry and hot months. In heeling-in plants for the winter the plants should be in thin layers (to prevent heating and thereby injuring the foliage) with very fine earth closely packed on the roots, and tops of each of the layers of plants are lapped over the earth covered roots of the previous layer. The beds of plants, thus heeled-in, are then lightly covered with wild hay, (thin enough to exclude sunlight, but not thick enough to exclude access of air) thus preventing injury to the foliage, and protecting the new root formation from the disastrous effects that would otherwise result from the too sudden withdrawal of frost in winter or spring. In practicing each of these methods we find the plants gain nearly one season of root growth. South of this latitude fall planting or heeling-in may be delayed from two to six weeks later in the season, according to the locality.

All plants in seed beds, and all beds of transplanted Evergreens and Larch, go through the winter in better condition if covered with wild hay and not uncovered until the withdrawal of frost in the spring.

Shearing Ornamental Evergreens.

As the beauty of hedges, and Evergreens planted singly in lawns, is dependent upon their symmetry of form and compactness of growth, as well as to such peculiarities in color, length of foliage, and forms of cones, as are incident to the species; hence gardeners have practiced shearing Arborvitæ, Junipers, Norway Spruce, etc. Many, if not all, of the Pines may be sheared at the time the trees are making their annual growth, by having the current season's growth shortened. The cutting may be made while the new growth is in a succulent state, at the time when it can be broken off, without peeling the bark, the proper season for shearing usually lasting ten to fourteen days. When the shearing is done at the right period of growth, terminal buds will be formed at the point of cutting, and frequently side-bud formation will also take place on the current season's growth of wood. The Scotch Pine, which is not only a fast, but sometimes a straggling, as well as an open grower, may be, by means of shearing, formed into a very compact, bushy and highly ornamental tree, and worthy of occupying small spaces in grounds to which it would not be adapted without shearing.

The Scotch Pine, Its Value for Economic Use, and for Timber-Belt Planting.

The Scotch Pine is adapted to all dry soils, rich or poor; it endures great extremes of drought, heat and cold; and in rapidity of growth it is only exceeded by the European Larch. The value of the timber for economic use ranks next to the wood of the White Pine. On account of these qualities, and the small per centage of loss in transplanting, the Scotch Pine ranks as one of the most valuable Evergreens for planting, for wind-breaks, screens, and timber-belts, for shelter for live stock, farm crops, hot-beds, gardens, and orchards.

Sargent, in referring to the growth of the different species of trees, in his statement of J. S. Fay's experiments in forest-tree planting, says:

"Scotch Pines transplanted from the Nursery in 1853, are now forty feet high, and from ten to twelve inches in diameter at one foot from the ground. Trees of the Scotch Pine raised from the seed planted in 1861, where the trees have grown, but in favorable situations, and which have been properly thinned, have been cut this winter, and measure thirty feet in height and ten inches in diameter, one foot from the ground, while the average of the trees in a large plantation of Scotch Pine, made in the same manner in 1862, and which received no special care, is twenty feet high, and six inches in diameter."

After referring to the value of the wood of the Scotch Pine for fuel the same author says:

"But fuel is the least valuable use to which the wood of the Scotch Pine can be turned. In Europe the lumber of this pine is considered more valuable than that of any other coniferous tree, the Larch excepted, and for all economic purposes it is rated far above American White Pine.

"The nature of these two woods and the uses to which they are each especially adapted, are so dissimilar that any comparison is not particularly interesting. A number of experiments made at the Royal Woolwich Dock Yard have shown that the wood of the Scotch Pine will resist a traverse strain, 11 times greater than that of the White Pine; that its resistance to a tensile strain is about twice as great, and its resistance to a vertical strain is .56 greater; while its specific gravity is .541 to .513 for the White Pine. All European writers—Duhamal to Laslet—agree that the wood of the Scotch Pine is the most durable pine wood."

The same writer quotes Newland's as saying:

"The lightness and stiffness of the Scotch Pine render it superior to any other kinds of timber for beams, girders, joists, rafters, and indeed for framing in general."

Sargent further says:

"From its greater strength, spars, top-masts, and the masts of small vessels which are often subjected to violent and sudden shocks, are made from the Scotch Pine in preference to any other wood, although on account of its greater lightness the White Pine is preferred for heavy masts and large spars. Since the supply of Larch has become entirely inadequate to the demand, the Scotch Pine is used in Europe for railroad sleepers more generally than any other tree, enormous quantities even being shipped from the northern ports to India for this purpose; although the wood of the White Pine is undoubtedly superior to the Scotch Pine for all purposes where a soft, light, easily worked, clear wood is demanded, the latter has qualities so desirable that its cultivation for economic purposes would be of great value—especially when it is remembered that it will grow in situations where the White Pine will not flourish."

Loudon says of the Scotch Pine :

"The wood is valued like that of every other pine, in proportion to its freedom from knots; and it is found that the knots of this species are more easily worked, and much less liable to drop out of flooring boards, than is the case with knotty boards of the Spruce or Silver Fir. The facility with which the wood of the Scotch Pine is worked occasions its employment in joining and house-carpentry, almost to the exclusion of every other kind of timber, wherever it can be produced. In point of durability, if it is kept dry, it equals the Oak,—more especially if it has been of slow growth, and is resinous. As a timber tree, for planting in poor, dry soils, in exposed situations, none can excel the Scotch Pine, and it is only equalled by the Larch."

In regard to the adaptation of the Scotch Pine to various soils, Mathews, as quoted by the same author, says—

"That the natural location of the Scotch Pine in poor, sandy soils does not result from these soils being best adapted for it, but from the seeds which are blown about by the winds, rising (germinating) readily in such soils, and the plants growing more vigorously than any other tree. Should any one doubt this, he observes, let him make an excursion into Mar Forest, and there he will find the Scotch Pine in every description of soil and situation, but always thriving best in good timber soil; and, in short, not differing very materially in respect to soil from the Sycamore, the Elm, the Oak, or the Ash."

In addition to the value of the wood of the Scotch Pine for economic use, its adaptation to all dry soils, and its vigorous growth in sheltered or exposed situations, it is believed that in this country, as in Europe, that the Scotch Pine has a greater geographical range than any other pine, and that in view of the probable exhaustion of the White Pine forests within the lifetime of the present generation, it is particularly desirable that a tree possessing such good qualities as the Scotch Pine, and which is susceptible of successful and profitable cultivation in a diversity of soils and situations, and in a wider range of climate, perhaps, than any other pine, should have its qualities more fully made known, so that it may become introduced into more general cultivation.

As the result of a number of years of observation, we are satisfied that there is no one species of Evergreen with which we are familiar that so perfectly possesses the qualities requisite to ensure its general success over a wide range of country, and prove as satisfactory to planters as the Scotch Pine, more especially for the purposes recommended by Sargent, who says :

"The rapidity of its growth in all situations, and its economic value, make the Scotch Pine the most valuable tree farmers can plant for screens and wind-breaks about their fields and buildings."

In localities where the Norway Spruce and European Larch are known to thrive, and where the timber-belts are designed to occupy considerable breadth of land, we would advise an intermixture of these two species of trees with the Scotch Pine in the plantation.

Hints as to the Nature of Evergreens.

The sap of coniferous Evergreen trees is resinous; the resin of commerce is the product of Evergreen trees; resin is insoluble in water

at an ordinary temperature,—hence if by exposure of the roots of Evergreen trees to drying winds, or to the sun, the sap hardens and the circulation of the sap is arrested and cannot be revived.

Evergreen Timber-Belts, for Sheltering Orchards, Farm Crops, Live Stock, and Hot Beds.

The importance of planting Timber-Belts for the purpose of sheltering small fruit plants and fruit trees in the winter, and as a preventative against the fruit from being blown off the trees in summer is so apparent, that we urge fruit-growers to fully investigate the subject, and to take action in the direction of planting trees for shelter, the beneficial results of which will enure to their individual benefit, to the community at large, and to posterity.

The injuries to fruit-trees resulting from the extraction of heat and excessive evaporation of moisture from the soil, and the stems and branches of fruit-trees, caused by the cold and dry northerly and westerly winds, is manifested in the injury or destruction of many kinds of small fruit plants and fruit-trees supposed to be hardy,—especially in all those orchards that are not protected by bodies of water that do not freeze in winter, or by natural forests, or some artificial barrier that have a tendency to modify the temperature, or break or impair the force of the wind.

Aside from any considerations in relation to the influence that forests exert upon the amount of rainfall, extremes of heat, drought, volume of moisture in the atmosphere, electrical and such other meteorological phenomena as have an influence upon the growth of vegetation in summer, there exists an abundance of facts which tend to show the deleterious effects which the absence or destruction of forests exert in the shortening of the length of the summer and the prolongation of the winter season, and the injury resulting to dormant vegetation in the winter.

The County of Milwaukee in this State was originally covered with a dense growth of natural forest. In the early settlement of the county when clearings of only a few acres in extent had been made in different localities, winter wheat, peaches, and many other tender fruits were successfully grown. Since the destruction of the principal portion of the forest, winter wheat, peaches, and other tender fruits are no longer successfully grown.

The advantages to be derived from the planting of Evergreen tree-belts would be the lessening the force of the wind in winter, and thereby modifying the relative temperature by lessening the extraction of heat and evaporation of moisture from the soil, and the sap of fruit trees, the lengthening of spring and autumn, the greater certainty of a larger average yearly yield of farm, garden and fruit crops, the enhanced value of real estate, and when the timber-belt plantations are made of considerable breadth, and closely planted, thinnings of the timber might be made, which would be of value for fuel and other economic uses.

As to the protection afforded by Evergreen tree-belts, Mr. J. J. Thomas says :

"Isaac Pullen, a well-known nursery man of Hightown, N. J., showed me last summer (1864) several belts of Evergreen trees which had sprung up from his nursery rows to a height of twenty-five to thirty feet in 10 years, and he stated that within the shelter of these screens his nursery trees, as well as farm crops, averaged fifty per cent. more than in bleak or exposed places."

Mr. A. R. Whitney, of Franklin Grove, Illinois, who has an orchard of many thousand trees, and who is considered to be one of the most successful grower of apples in the Northwest, states that he has at different times in the past thirty-odd years planted different kinds of Evergreen trees in and around various parts of his orchard, and that these trees have attained a height of thirty to forty feet, and that any person who had any doubt about the beneficial results supposed to be derived from the protection afforded by belts and groups of Evergreen trees, are cordially invited to make a personal inspection of his orchard.

Sargent says :

"The influence of trees especially of spiked-leaved species, on local climate is important. Such plantations serve as a material check to the natural force of cold winds from the north, which rapidly lower the temperature, hasten evaporation, and blow into drifts the snow which would otherwise protect the ground with an even covering. There is probably no way in which the farmers of this State could more easily or more rapidly increase its agricultural product than by planting such screens from the northeast to the northwest of their farms, and their attention is particularly directed to the importance of this subject, * * * as a means of direct profit, it does not seem unreasonable to predict that such protection to our fields would increase the profits of their cultivation fully twenty per cent. Orchards thus protected are still productive, and all gardeners know that plants generally supposed too tender to support our climate will thrive when planted under the protection of a garden wall, or among Evergreen trees. What garden walls are to the horticulturist, these broad Evergreen plantations should be to the farmer."

Becquerel, as quoted by the same author, says :

"In the Valley of the Rhone a simple hedge two metres in height is sufficient protection for a distance of twenty-two metres."

"The mechanical shelter," says Mr. Marsh, "acts no doubt chiefly as a defense against the mechanical force of the wind ; but its uses are by no means limited to that effect. If the current of air moves horizontally, it would prevent the access of cold or parching blasts to the ground for a great distance."

Mr. Marsh says Becquerel's views—

"Have been amply confirmed by recent extensive experiments on the bleak, stony and desolate plain of the Crau in the department of the Bouches du Rhone, which had remained a naked waste from the earliest ages of history. Belts of trees prove a secure protection even against the piercing and chilly blasts of the Mistral, and in their shelter plantations of fruit-trees and vegetables thrive with the greatest luxuriance.

Sargent says :

"Experiments of a similar nature on a large scale have been made in Holland, and lands which were formerly considered unimprovable, such was the force of the winds blowing from the North Sea, have been rendered almost the most productive in Europe, simply by sheltering them with rows of trees placed at regular intervals and at right angles to the direction of the wind."

Dr. E. G. Mygatt, of Kenosha County, Wis., in a letter dated Dec. 15, 1875, in stating his views in regard to the beneficial results derived from the planting of timber-belts, says:

"It would pay you to see the protection to my orchard during the past seven-teen years. Only one tree has died behind my wind-break out of one hundred and twenty trees, now about twenty years old, and some of them of tender kinds."

Gardeners who have their hot-beds sheltered with post and board fences, will find it advantageous to closely plant one or two rows of Scotch Pine and Norway Spruce at a distance of about four or five feet from, and on the East, North and West sides of their fences. If the Evergreens are planted at, or soon after the time of the building of the fences, the growth of the Evergreens, after becoming established, is so rapid that they will afford an excellent protection by the time the post and board fences would require renewal. The cost of the Evergreen shelter would not only be less, but would be more permanent, and more ornamental than the board fences usually constructed for the purpose of shelter.

Two or three rows of closely planted Evergreens will be more effective in breaking or impairing the force of cold winter winds than twenty rows of deciduous trees which have only their naked stems and branches to offer as a resistance. The plants for the Evergreen timber-belts will cost less in the price of plants, cost of boxes, packing, and freight charges, occupy less breadth of land, and cost less labor in planting; besides being more ornamental than the deciduous trees from the fact that the Evergreens retain their foliage throughout the whole year.



ARBORVITÆ HEDGE.

When Evergreen trees are out of the ground, the roots should be kept *constantly moist* and the tops *dry* until planted. In planting, the earth should be *firmly packed* on the roots with *loose* soil on the *surface*, and mulched with some coarse litter *immediately* after planting. By the adoption of these simple precautions, our loss of plants in our annual transplanting of one to one and a half millions of plants is so trifling as not to be worth an estimate.

On receipt of plants, if the ground is not in condition for immediate planting, the packages should be opened, and the roots of the plants puddled in a thin mud mortar, made of any good soil, and of the consistency of thick paint. Trenches should be opened in some soil where the water will not accumulate, in some cool, shady place. The plants should be spread out thinly, and fine earth sprinkled among and firmly packed on the roots. If the plants are procured in the fall, and the plants are to remain thus heeled-in until spring, the plants should be lightly covered with wild hay, after the ground has been frozen to the depth of two inches. This covering should not be removed until a few days before the commencement of planting, care being used not to take up the plants until the frost is entirely withdrawn from the roots. European Larch may be heeled-in in the same manner. In this instance, two-thirds, or even *all* the *bodies* and *tops* of the Larch may be entirely covered with earth. When plantings we usually place a quantity of the plants in a bucket of water and take out a few plants from time to time as they are wanted. If treated in this manner, there is no danger of loss, as the *roots* are thus kept *constantly moist*. Small sizes of Evergreens and Larch, if not protected in some manner, for one or two years after planting are apt to have the roots drawn out of the soil by the alternation of freezing and thawing. Mulch is a good preventative. When planted in nursery row, the earth should be drawn up to the plants in autumn with a hoe, or shovel plow.

Number of Plants or Trees Required to Plant an Acre at a given Distance.

DIST. APART.	NO. OF PLANTS.	DIST. APART.	NO. OF PLANTS.
1 by 1 foot.....	43,560	6 by 6 feet.....	1,210
2 by 1 foot.....	21,780	6 by 5 feet.....	1,452
2 by 2 feet.....	10,890	6 by 4 feet.....	1,815
3 by 1 foot.....	14,523	6 by 3 feet.....	2,420
3 by 2 feet.....	7,260	6 by 2 feet.....	3,630
3 by 3 feet.....	4,840	6 by 1 foot.....	7,260
4 by 1 foot.....	10,890	7 by 7 feet.....	889
4 by 2 feet.....	5,442	8 by 8 feet.....	680
4 by 3 feet.....	3,630	10 by 10 feet.....	435
4 by 4 feet.....	2,722	12 by 12 feet.....	302
5 by 1 foot.....	8,712	15 by 15 feet.....	194
5 by 2 feet.....	4,356	18 by 18 feet.....	135
5 by 3 feet.....	2,904	20 by 20 feet.....	109
5 by 4 feet.....	2,178	25 by 25 feet.....	69
5 by 5 feet.....	1,742	33 by 33 feet.....	40

Suggestions as to the Management of Small Sizes of Evergreens and European Larch. previous to the final Planting.

When the ground which is designed for a Timber-Belt plantation is not in a suitable condition for immediate planting, it is advisable to plant the small sizes of Evergreens and Larch, into nursery rows, where they may be cultivated and cared for, until the ground for the final planting can be prepared. The planting in nursery row can be quickly and cheaply done, by plowing furrows five or six inches in depth, at a distance of two or more feet apart, and planting the trees at a distance of eight to twelve inches apart in the furrows, the distance to be regulated by the size of the plants. The trees may remain in the nursery rows for two years, when they will have become, nice, well-rooted trees, suitable for the final transplanting into screens, wind-breaks, timber-belts, ornamental grounds, or forest-tree plantation. By the adoption of this plan, the final cost of the trees will be somewhat increased, but there will be a gain in their value, resulting from their growth, during the time they are standing in nursery rows, and as the growth of some of the trees will be greater than others, it will be advisable, at the final transplanting to assort them into two or more sizes, although this is not essential, when the trees are designed for forest-tree plantation, but it will add very much to the symmetry and general appearance of screens, wind-breaks, and timber-belts, to have the trees carefully assorted so that the trees of each size may be planted separately.

Table

Showing estimate of cost of a Timber-belt of three rows for Shelter. Rows 4 feet wide, Plants 4 feet apart in the row. Outside rows Scotch Pine, middle row Norway Spruce. The Tree-belt to enclose four sides of the farm.

SIZE OF FARM.	Length of Belt in Rods.	No. of Plants re- quired for three Rows	Cost of Plants, \$7.00 per 1,000	Expense of Pre- paring Ground and Planting	Expense of three years' cultiv'n.	TOTAL COST.
160 Acres.....	640	7,920	\$55 44	\$27 92	\$60 00	\$143 36
80 "	480	5,940	41 58	20 94	45 00	116 52
40 "	320	3,960	27 72	13 96	30 00	71 68
10 "	160	1,980	13 86	6 98	15 00	35 84

Price List of Assorted Evergreen Seedlings.

NOT TRANSPLANTED.

Price List of European Larch, Evergreen, and other kinds of Tree Seeds, mailed on application.
Price List of Choice Garden Seeds ready in January, 1878.

We usually commence shipping Evergreens about the 1st of September, and continue until the 15th of November, and are generally able to ship South during mild weather in the winter. Spring shipments usually commence April 10th, and continue until the 25th of May. The European Larch commences growth at a *low* temperature, and should be planted in the fall, or the plants procured and heeled in, so as to be at hand for early spring planting.

Seedlings marked with an * are in cellar, and can be shipped by express or sent by mail (the smallest sizes are most suitable for mailing) at any time in winter, and for the purpose of late Spring planting, we can usually hold Evergreens back until June 1st.

20,000 or more at Special Rates.

	Per 10.	Per 100.	Per 1,000.	Per 10,000.
*NORWAY SPRUCE, 10 to 15 inch.....		\$1 50	\$10 00	\$90 00
* " " 6 to 9 "		1 10	7 00	60 00
* " " 4 to 6 "		90	5 00	45 00
*SCOTCH PINE, 9 to 12 inch.....		1 20	8 00	.....
* " " 7 to 9 "		1 10	7 00	.....
* " " 1 year		90	5 00	.....
*AUSTRIAN PINE, 6 to 8 inch.....		1 20	9 00	.....
* " " 3 to 6 "		1 10	7 50	70 00
* " " 1 year		90	5 00	.....
*MOUNTAIN PINE, (dwarf) 9 to 12 inch.....		2 00	.....	.....
* " " 6 to 9 "		1 50	10 00	.....
* " " 4 to 6 "		1 20	9 00	80 00
* " " 2 to 4 "		1 10	7 00	65 00
WHITE PINE, 1 year.....		90	5 00	.....
ARBORVITÆ, Am., 2 years.....		6 00	.....
*WHITE SPRUCE, 8 to 10 inch.....		1 90	13 00	.....
* " " 6 to 8 inch.....		1 60	11 00	.....
* " " 3 to 6 inch.....		1 20	9 00	.....
SILVER FIR, 2 to 5 inch.....		5 00	.....	.....
BALSAM FIR, 2 to 4 inch		3 50	.....	.....
*JUNIPER, English, 10 to 15 inch.....		75	5 00	.....
* " " 6 to 10 "		60	4 00	.....
* " " Excelsa, 8 to 12 "		1 00	7 00	.....
* " " 4 to 8 "		80	5 50	.....
* " " Swedish, 8 to 12 "		1 00	.....	.....
* " " 4 to 8 "		80	.....	.....

Price List of Evergreen Seedlings.

ONCE TRANSPLANTED.

	Per 100.	Per 1,000.
NORWAY SPRUCE, Slender, suitable for Screens and Timber-belts.		
" " 15 to 18 inch.....		.....
" " 12 to 15 "	\$1 50	\$10 00
" " 9 to 12 "	1 20	9 00
NORWAY SPRUCE. Many of these trees, with one or two or more transplantings, will make nice Ornamental Trees, and are all suited for immediate planting for Screens and Timber-belts.		
" " 9 to 12 inch.....	2 00	15 00
" " 6 to 9 "	1 80	12 00
" " 4 to 6 "	1 20	8 00

		Per 100.	Per 1,000
SCOTCH PINE, Suited for immediate* planting for Screens and Timber-belts.			
" " 9 to 12 inch.....		1 80	12 00
" " 6 to 9 ".....		1 50	10 00
" " 4 to 6 ".....		1 20	9 00
SCOTCH PINE, Stocky, twice sheared, well furnished, nice for ornamental planting, or suitable for immediate planting for Screens and Timber-belts.			
" " 9 to 12 inch.....		3 50	25 00
" " 6 to 9 ".....		2 75	18 00
" " 4 to 6 ".....		2 00	15 00
MOUNTAIN PINE, beautiful hardy dwarf, 4 to 8 inch.....		2 50	.....
AUSTRIAN PINE, 9 to 12 inch, not bushy.....		2 50	.....
" " 6 to 9 ".....		2 00	.....
" " 2 to 6 ".....		1 50	10 00
WHITE PINE, 6 to 8 inch.....		2 50	.....
" " 3 to 6 ".....		2 00	15 00
PITCH PINE, 4 to 6 ".....		2 00	15 00
" " 2 to 4 ".....		1 80	12 00
		Per 10.	Per 100. Per 1,000.
HEMLOCK SPRUCE, 15 to 20 inch.....	\$2 00	.....	.....
ARBORVITÆ, Chinesc, 9 to 12 inch.....	50	.....	.....
" " 6 to 9 ".....	40	.....	.....
" " American, 18 to 24 ".....	2 00	15 00	.....
" " 24 to 36 ".....	3 00	20 00	.....
BALSAM FIR, 24 to 36 inch.....	3 00	20 00	.....
" " 18 to 24 ".....	2 00	15 00	.....
" " 10 to 15 ".....	1 50	10 00	.....
LAWSON'S CYPRESS, 1 to 3 inch.....	2 00	.....	.....
RED CEDAR, 6 to 9 inch.....	60	4 00	.....

Hardy Defensive Hedge Plants.

Grown from American. Seed

Per 1,000.

*HONEY LOCUST, (does not sprout from the roots), 2 year.....	\$ 6 00
*BERBERRY, 8 to 10 inch.....	10 00
* " 6 to 8 inch.....	8 00
* " 4 to 6 inch.....	6 00

The Berberry is perfectly hardy, branches out from the collar, does not sprout from the roots, and being a thorny bush, and growing 6 to 9 feet in height, requires no shearing, and will make a perfectly defensive hedge in 5 to 6 years with the same care and cultivation for the first 2 or 3 years after planting that is given to corn or potatoes. Loudon in his Arboretum et Fruticetum Britannicum says: "The common Berberry will live for two or three centuries without increasing much in size. The rate of growth when the plant is young is rapid; and, in consequence, in five or six years will attain the height of 7 or 8 feet; but it grows slowly afterwards."* The plant makes an excellent "hedge"***

European Larch.

		Per 100.	Per 1,000.
*LARCH, not transplanted, 18 to 24 inch.....	2.00	\$15 00	.....
* " " " 10 to 15 ".....	1.25	9 00	\$80 00
* " " " 6 to 8 ".....	1.50	7 00	65 00
" " " 1 year,.....		3 50	30 00
" Once " 10 to 15 ".....	1.50	10 00	95 00
" " " 8 to 10 ".....	2.50	9 00	85 00
" " " 6 to 8 ".....	1.00	8 00	75 00

White Ash.

(NURSERY GROWN SEEDLINGS.)

	Per 1,000.	Per 10,000.
*ASH, 1 year, 6 to 12 inch.....	\$6 00	\$55 00
* " 1 year, 4 to 6 "	4 00	30 00

Fruit Stocks.

(No Discount.)

	Per 1,000.	Per 10,000.
*APPLE SEEDLINGS, No. 1.....	\$4 00	\$35 00
* " " No. 2.....	2 00	18 00
* " " No. 3, Mailing and budding size.....	1 00	.....
*PLUM, Native, 1 year.....	15 00	.....
*PEAR SEEDLINGS, 1 year, No. 1.....	10 00	.....
* " " " No. 2.....	5 00	.....
* " " " No. 3.....	3 50	.....
* " " " Budded in Seed Bed, Bartlett, Flemish Beauty, Winter Nellis, etc.	40 00	.....

Miscellaneous Seedlings and Stock.

	Per 10.	Per 100.	Per 1000.
*WHITE ELM, 1 year .....	.....	.....	\$3 50
SCOTCH ELM, trans., 15 to 36 inch.....	.....	\$4 00	.....
*ENGLISH ALDER, 2 year seedlings .....	.....	2 00	.....
" " 1 " .....	.....	.....	6 00
*RED-BUD, 1 " .....	.....	4 00	.....
*FLORIDA DOGWOOD, 1 year seedlings.....	.....	2 00	.....
*MULBERRY, BLACK, 2 " .....	.....	3 00	.....
" RED, 1 " .....	.....	2 50	20 00
*KENTUCKY COFFEE, 1 " .....	.....	4 00	.....
*PERSIMMON, 1 " .....	.....	2 00	15 00
" trans. seedlings, 6 to 10 inch .....	.....	2 50	.....
*CALYCANTHUS, 1 year seedlings .....	.....	2 00	.....
*HONEY LOCUST, 2 year seedlings .....	.....	9c	6 00
* " " 1 " .....	.....	.....	4 00
SYCAMORE, 1 ½ to 4 feet, trans.....	.....	4 00	.....
HORSE CHESTNUT, 10 to 15 inch, trans.....	.....	3 00	.....
" " 18 to 24 inch, trans.....	.....	5 00	.....
" " 24 to 36 inch, trans.....	.....	10 00	.....
" " 3 to 4 feet, trans.....	\$2 50	.....	.....
SWEET " 10 to 15 inch, trans.....	.....	3 00	.....
" " 18 to 24 inch, trans.....	.....	5 00	.....
" " 2 to 3 feet, trans.....	.....	7 00	.....
CATALPA, 1 ½ to 3 feet, trans.....	.....	4 00	.....
*BIRCH, Eu. common weeping, 2 to 3 feet, trans.....	.....	4 00	.....
" " " 3 to 4 feet, trans.....	.....	6 00	.....
" " " 4 to 5 feet, trans.....	1 10	8 00	.....
WHITE MULBERRY, 5 to 6 feet, trans.....	1 00	7 00	.....
" " " 6 to 7 feet, trans.....	1 10	8 00	.....
" " " 7 to 9 feet, trans.....	1 35	10 00	.....
HONEY LOCUST, 10 to 20 inch, trans.....	.....	4 00	.....
BLUE ASH, 5 to 7 feet, trans.....	1 35	10 00	.....
AILANTUS, 4 to 5 feet, trans.....	1 20	.....	.....
" 6 to 7 feet, trans.....	1 50	.....	.....
LILAC SEEDLINGS, 6 to 15 inch, trans.....	.....	3 00	.....

	Per 10	Per 100.	Per 1,000.
*BERBERIS DULCIS, 6 to 12 inch, trans.....	1 00	.....	.....
“ VULGARIS—(see Hedge Plants) .....	.....	.....	.....
LABURNUM, 6 to 15 inch.....	70	.....	.....
COLUTEA ARBORESCENS, 6 to 15 inch	80	.....	.....
MAPLE, NORWAY, 6 to 12 inch	60	4 00	.....
* “ OREGON, 4 to 8 inch.....	1 00	7 00	.....
* “ SILVER, seedlings, 1 year.....	.....	60	4 00
“ “ 7 to 8 feet.....	.....	10 00	60 00
“ “ 8 to 9 feet.....	.....	12 00	70 00
“ “ 9 to 10 feet.....	.....	15 00	80 00
“ “ 10 to 12 feet.....	.....	20 00	.....
“ ASH-LEAVED (Box Elder) 6 to 7 feet.....	.....	10 00	65 00
“ “ “ 7 to 8 feet.....	.....	12 00	75 00
“ SUGAR, 1 to 2 feet, trans.....	.....	3 00	25 00
UPRIGHT HONEYSUCKLE, 4 to 5 feet	1 30	10 00	.....
AMORPHA, 12 to 18 inch.....	80	.....	.....
YELLOW FLOWERING CURRANT, 4 to 5 feet	1 00	.....	.....
WIGELIA ROSEA, 2 to 3 feet.....	1 50	.....	.....
DICENTRA SPECTABILIS	1 00	8 00	.....
SPIREA CRENATA, 12 to 18 inch.....	1 50	.....	.....
WEEPING MOUNTAIN ASH, 5 to 6 feet.....	6 00	.....	.....
LOMBARDY POPLAR, 8 to 9 feet.....	1 50	10 00	.....
GOL'N WILLOW, 10 to 12 feet.....	4 00	.....	.....
WIS. WEEPING WILLOW, 9 to 10 feet.....	10 00	.....	.....
“ “ “ 6 to 7 feet	2 50	.....	.....
COTTONWOOD, 10 to 12 feet	2 00	15 00	.....
“ CUTTINGS .....	.....	.....	3 50
MOUNTAIN ASH, 6 to 7 feet.....	2 00	16 00	.....

Fruit Trees, Etc.

For the purpose of closing out our stock of Apple Trees, we offer them at less than the cost of production in Wisconsin. The selection of varieties must be left to us. The varieties 5 to 7 feet are principally Haas, Ben Davis, Perry and Gol'n Russets, Walbridge, Fall Stripe and Plumb's Cider. Varieties 4 to 5 and 5 to 6 feet include the above kinds, and some Romanite, Talman Sweet, Sops of Wine, Red Astrachan, Oldenburg, Stark, Tetofski, Fameuse, Utter Pewaukee, English Russet, Bethlehemite and Northern Spy, etc.

	Per 10.	Per 100.	Per 1,000
APPLE TREES, 5 to 7 feet.....	.....	\$10 00	\$60 00
“ “ 5 to 6 “ .....	.....	9 00	55 00
“ “ 4 to 5 “ .....	.....	6 00	40 00
“ “ Walbridge, Wealthy, Gol'n Russett, Fameuse, 2 to 3 feet.....	.....	.....	30 00
Hislop, Transcendent and Yellow Crabs, 5 to 6 ft.....	.....	10 00	.....
Byer's Beauty Crab, New, Red, said to be large and fine, originated in Berien Co., Mich., 4 to 5 feet, \$1.00 each.....	7 50	.....	.....
PEAR, Flemish Beauty, Bartlett, 4 to 6 feet.....	3 50	32 00	.....
PLUM, 4 to 6 feet.....	\$4 00	35 00	.....
CHERRY, Kentish, 4 to 5 feet.....	1 75	15 00	.....
“ “ 3 to 4 feet.....	1 30	10 00	.....
“ Early Richmond, 5 to 6 feet.....	\$3 00	25 00	.....
“ “ 4 to 5 feet.....	2 50	18 00	.....
CONCORD GRAPE, 3 years.....	.....	1 30	10 00
TURNER RASPBERRY, best hardy red for market and family use.....	.....	1 00	6 00
WILSON STRAWBERRY.....	.....	.....	5 00
DOWNING “ .....	.....	.....	6 00
CURRENTS, Black Naples, Victoria, White Grape, Cherry.....	.....	4 00	.....



AUSTRIAN PINE (*PINUS AUSTRIACA*).